

IPM Education for Maintenance Gardeners



Acknowledgements

- Information in the following presentation was adapted from materials produced by the University of California Integrated Pest Management Program
- For more information please visit <http://www.ipm.ucdavis.edu/>



Project Team

- San Luis Obispo County Agricultural Commissioner
 - Tamara Kleeman, Janice Campbell, Laura Hebert, Edwin Moscoso
- UC Cooperative Extension
 - Mary Bianchi, Amy Breschini, Cheryl Wilen (UC IPM)
- Cal Poly San Luis Obispo Horticulture / Crop Science
 - David Headrick, Terry Vassey
- Pesticide Applicators Professional Association
 - Judy Letterman
- Partners: Suzanne McCaslin, Osvaldo Olmos

What we wanted to accomplish

- IPM Education for Maintenance Gardeners
 - Retail suppliers
 - Peer trainers
- Improved decisions about pest management
 - Safer working conditions
 - Reductions in pesticide use / misuse
 - Improved business skills for Gardeners
- Married with pilot project for licensing
 - CE units

What we knew about Maintenance Gardeners

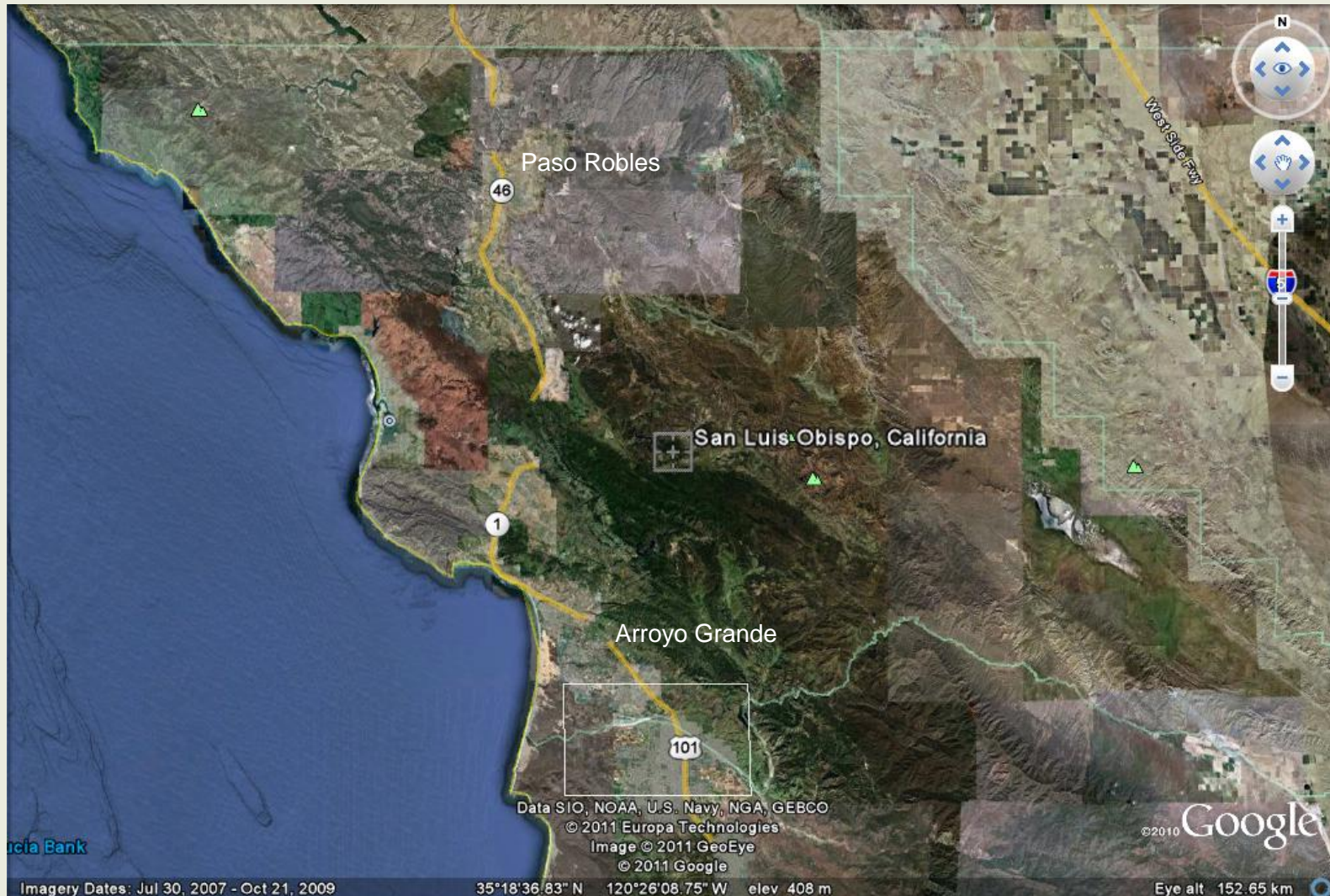
- Availability of education poor in many locations
- Information sources included
 - Peers
 - PAPA
 - Vendors
 - Word of mouth
- Decisions on pesticides often dictated by clients

What we packaged

- Conventional IPM systems and materials
- Predominantly UC IPM resources
- Translation of existing materials



Twelve Workshops - 2010



Workshops

- Retail employees at point of sale
- Spring – Vertebrate pest control
- Summer – Weed control in lawns
- Fall – Insect and disease control

Promote Healthy Lawns

- To exclude weeds from lawns - keep it healthy:
 - Irrigate properly
 - Mow correctly
 - Fertilize properly
 - Dethatch and aerate
 - Use herbicides correctly when needed



Weed Identification

<http://www.ipm.ucdavis.edu/TOOLS/TURF/>

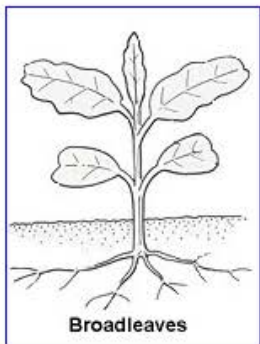
How to Manage Pests

The UC Guide to Healthy Lawns

[Index to contents](#) | [Acknowledgments](#) | [Related UC publications](#) | [References](#) |

Weed key

Select the illustration that best matches your weed sample.



Broadleaves

Leaves are wide, veins branch out in different directions.

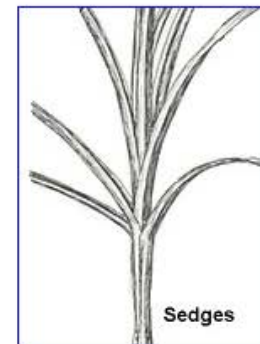
[Broadleaf ID characteristics](#)



Grasses

Leaves are narrow, arranged in sets of 2; stems are rounded or flattened.

[Grass ID characteristics](#)



Sedges

Leaves are narrow, arranged in sets of 3; stems are triangular in cross section.

[Sedge ID characteristics](#)

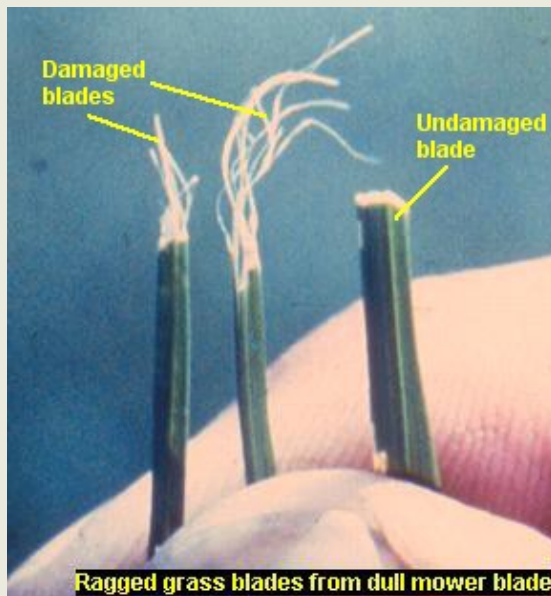
Weed Identification

- Hands-on identification during workshops



Mower Care

- Be sure that your mower is in good working condition.
 - Mower blades should be sharpened so grass is not damaged as this will make the lawn more susceptible to disease infection.



Timing of Herbicide Application

- Pre-emergent herbicides
 - are applied before weeds emerge from the soil.
- Post-emergent herbicides
 - applied after weeds have emerged from the soil. These control actively growing weeds.



UC Statewide IPM Project
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Materials created for special local problems



Pacific Flatheaded Borer

The adult Pacific flatheaded borer blends in well with the bark and is not commonly seen. The females lay their eggs on injured areas on the trunks of young trees or limbs of older trees. Young larvae feed under the bark in the rapidly growing outer wood and bore deeper into the trunk to pupate. Excavations are usually filled with a finely powdered sawdust. There is only one generation a year.

Keep trees healthy and vigorous. Protect young trees from sunburn with whitewashing. Remove and destroy infested wood immediately. Insecticide treatments are not recommended.



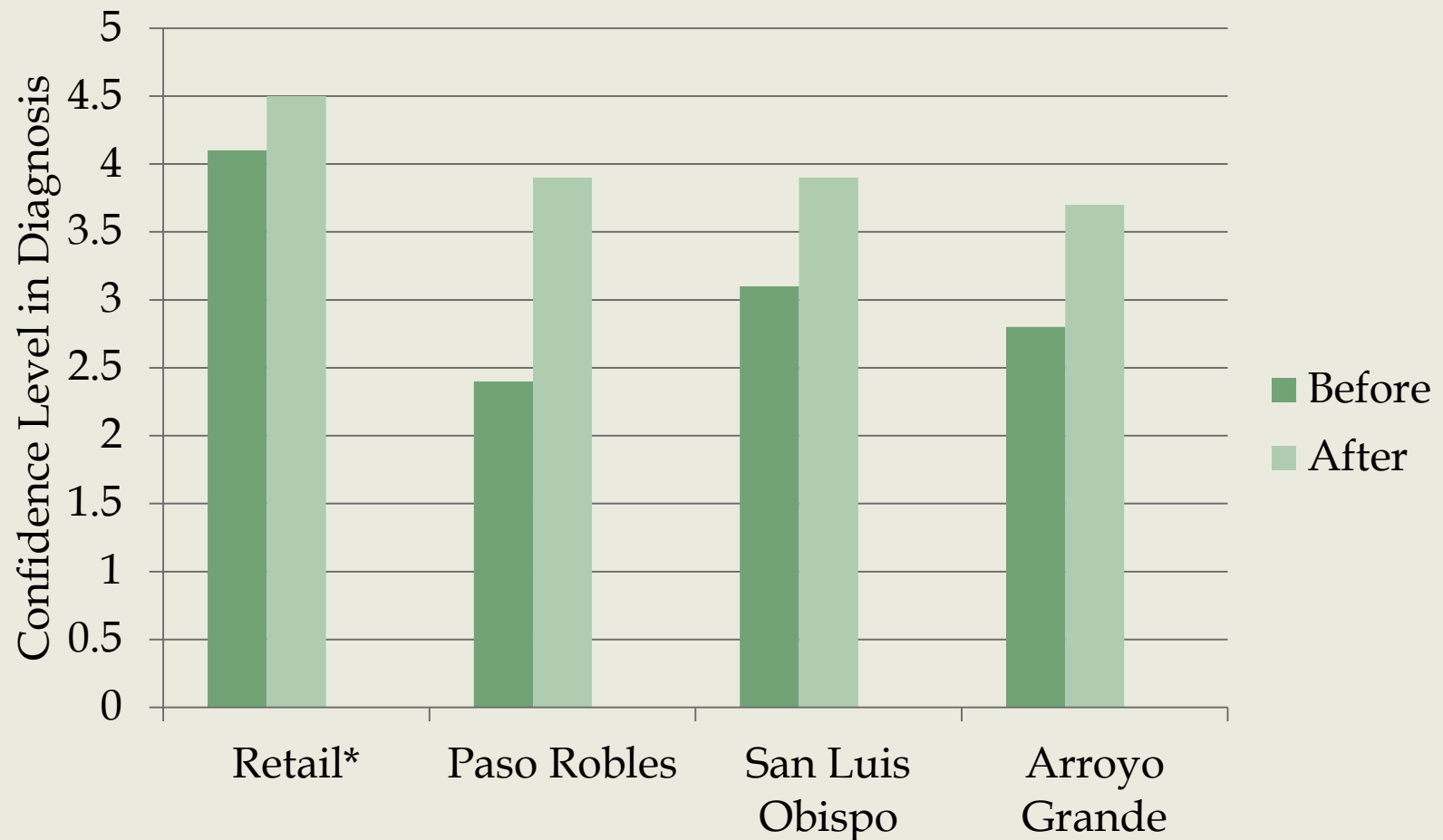
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Peer Trainers

- Two Peer Trainers
 - Retail Employee
 - PCA
 - Primary contact for Maintenance Gardeners at her location
 - Landscape Contractor
- Were Part of Presentations at workshops
- Encouraged participation



Change in Confidence Levels in Diagnosing Pest Problems as a result of participation in workshop



Extension of materials from workshops has already begun

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Information for pest management professionals and pesticide applicators

UC IPM **Green Bulletin**
University of California
Agriculture and Natural Resources

Vol. 1 • No. 6 • February 2011

Ways to Calibrate Spray Application Equipment

Supplies for Calibrations

- Buckets and a measuring container with markings in ounces;
- A stopwatch;
- A tape measure and stakes to mark out the test area; and
- A calculator.

Applying the wrong amount of pesticide can result in poor control if not enough is used or overuse if too much is applied. If little control is achieved, the end result might be a second application that will be more expensive due to the cost of labor involved. If too much is used, the cost of the extra material is one consideration, but there might also be crop damage and a higher risk of pesticides moving off-site in runoff or leaching into groundwater.

In addition to reading the label carefully and making sure that pesticides are not washed off into storm drains, the applicator must be sure equipment is properly calibrated so that the proper amount of pesticide is applied. Poor calibration also can result in a lot of leftover pesticide. The less solution that is leftover, the less there is that has to be disposed of. For liquid applications, one needs to know the area to be sprayed, how much pesticide is needed to spray that area, and how much water to use to apply the pesticide so that it will cover the area to be treated. Because people walk at different speeds or otherwise move the sprayer differently than another person, it is important that each person perform the calibration steps (Fig. 1) if the equipment is shared.

Liquid applications usually are made using backpack sprayers with a single nozzle and a hand-pumping bar on the side, tanks with a gun-type nozzle and electric or gas pump, or a small tractor with a tank and boom with multiple nozzles on the boom. Be aware that people walk at different speeds, so the calibration for one person is not the same as another even if using the same sprayer. Also, you can't assume that one sprayer is set up the same as another, so you need to do a calibration if you change sprayers.

Below are two calibration methods you can use to determine how much water and pesticide to put in a tank for a given area and for a specific person doing the application and using a specific piece of equipment. A third method is illustrated in Table 1. For estimating how much pesticide is needed when spraying trees and shrubs, see the *Ask the Expert!* section on Page 6 of this newsletter.

Backpack Sprayers

- Measure out a representative area of 1,000 square feet (20 by 50 feet works well, or 5 by 200 feet is good if you are going to be spraying medium).
- Put clean water into the tank.
- Walking at your normal pace and using your normal method of spraying, time how long it takes for you to spray the area you measured out. It is best to do this two to three times and get an average time.

- Get a bucket or other container that has markings in ounces and spray water into it for the same amount of time it took you to spray 1,000 square feet. This amount is how much water you need to put in the tank for 1,000 square feet.
- How much area will you be spraying? Measure the area. If you are applying to a number of small sites, you can combine the measured areas.
- How much pesticide do you need? Most landscape pesticide labels give the amount to apply as ounces per 1,000 square feet. If you have 2,000 square feet and the label says 5 ounces per 1,000 square feet, then you need 10 ounces. If you have 500 square feet and the label says 5 ounces per 1,000 square feet, then you need 2.5 ounces.
- How much water do you need? You found out how much water you needed to cover 1,000 square feet. If you need to spray 2,000 square feet, you will need two times more water (2,000 divided by 1,000 equals 2). If you need to spray 500 square feet, you would need half as much water (500 divided by 1,000 equals 0.5).

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Malas Hierbas en Pastos de Jardines

<http://www.ipm.ucdavis.edu/TOOLS/TURF/TURFSPECIES/index.html>

ZACATE MANO DE CANGREJO

Durante la primavera y el verano esta maleza se puede controlar reduciendo riegos, asegurándose que no tenga tuberías rotas o escape de agua, sembrando. Herbicidas de pre-emergencia se deben aplicar en febrero. Note que cabezas de semillas (derecha) vienen de diferentes lugares. Compárela con Zacate de Bermuda abajo.



ACEDERILLA Se encuentra en todo el año. Algunas veces tiene hojas púrpuras. Con frecuencia se le confunde con el trébol pero tiene hojas de forma de corazón y cinco pétalos en flores amarillas. Las semillas son expulsadas de las vainas (vea derecha) y se pegan a la cortadora de pasto. Limpie su cortadora de pasto con aire ó agua. Herbicidas de post-emergencia pueden usarse pero asegúrese que no van a causar daño a los pastos.

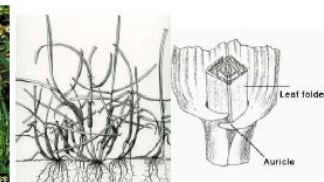
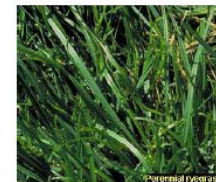


ESPECIES DE CÉSPED MÁS COMUNES

<http://ipm.ucdavis.edu/TOOLS/TURF/TURFSPECIES/index.html>

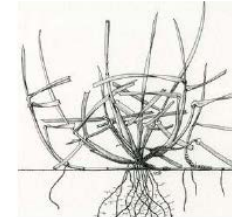
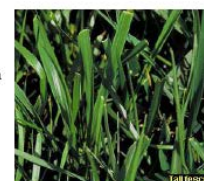
RAIGRÁS PERENNE

Hierba de temporada fresca, bien adaptada a las regiones costeras. Prefiere sol pleno pero tolera sombra parcial. Puede tolerar mucho tráfico. Su rápida apacición, ayuda a suprimir las malezas. De textura fina, con la hoja doblada en la yema. La parte posterior de la hoja es brillante, y las puntas de las hojas son cónicas. El collar tiene generalmente crecimientos (aurículas) que cierran el tallo. No produce rizomas o estolones. Tiene un hábito de crecimiento de tipo pajonal.



FESTUCA ALTA

Pasto de estación fresca, bien adaptado a áreas bajo sol ó parcialmente bajo sombra. Se mantiene verde durante clima templado. Se han introducido nuevas variedades de festuca que son más finas en textura como lo es el césped festuca tipo alto y más cortas en estatura como lo es el césped festuca tipo enano. Es el tipo de pasto más utilizado como césped California. Es de textura gruesa con un tono de medio verde oscuro. Es de tipo amontonada en lugar de tipo rasterya. Puede ser necesario que se resiembre ya que pueden encontrarse algunas áreas abiertas. Se de pocas necesidades de mantenimiento, elevada resistencia al pisoteo, tolera sequías y gran capacidad de adaptación a condiciones adversas. Se reproduce vegetativamente por ahijamiento. Altura de corte entre 4 y 6 cm.



Extension

- Extension of materials from workshops has already begun

Information for pest management professionals and pesticide applicators

UC IPM **Green Bulletin**

University of California
Agriculture and Natural Resources

Vol. 1 • No. 5 • December 2010

Ground Squirrel Management

Highlighting the Connection between Effective Control and Water Quality Issues

California ground squirrels (Fig. 1) are found throughout most of the state. They are native and quite adaptable to most of California's diverse environments. They can live in close association with people and feed on crops and ornamental plants. A major problem associated with squirrels is their burrowing activity that can damage irrigation systems, landscapes, and other structures. When they cause these problems, control often is necessary.

Ground squirrels prefer dry climates and do not like areas with high soil moisture. Most of our irrigation systems, especially drip and sprinkler, do not create the continuous soil moisture that would deter squirrels from the area. Squirrels also are good at burrowing just outside the irrigated area or on slopes and other relatively dry places. Squirrels impact water use mostly by chewing on plastic pipes or burrowing in levees, berms, and other water structures. Because of their close association with irrigated areas, squirrel burrowing can lead to soil movement into water systems. Improper use of rodenticides such as broadcasting into waterways also can lead to contamination of surface



W. J. Griesed, UC

Figure 1. California's ground squirrel.

water. Contamination of subsurface water has not been identified as a problem with rodenticide use.

Dealing with ground squirrels takes a good understanding of the animal and the control options available. Ground squirrels have a distinct activity pattern throughout the year. Basically they hibernate in the winter, breed during the early spring, mature during the summer, and collect seeds during the fall. Some adult squirrels go into a summer hibernation to avoid the heat, but the young ones remain active, even during hot summer days. Another important seasonal activity is their feeding preferences. During the spring, they prefer fresh green



L. L. Loom, UCR

Figure 2. Burrow entrance.



R. S. Kelson, UCR

Figure 3. Burrowing damage beneath a bridge.

vegetation, but in the summer and fall, they like seeds. Knowing these changes will help in understanding their seasonal activity and also in selecting the appropriate control strategy.

Ground squirrels live in underground burrows (Figs. 2 and 3). Often burrows interconnect and are home to several squirrels. Burrow systems usually are dumped together to form a squirrel colony. Once established, the squirrel colony can remain in that area for many years. Squirrels

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California Ground Squirrel - Calendar of Management

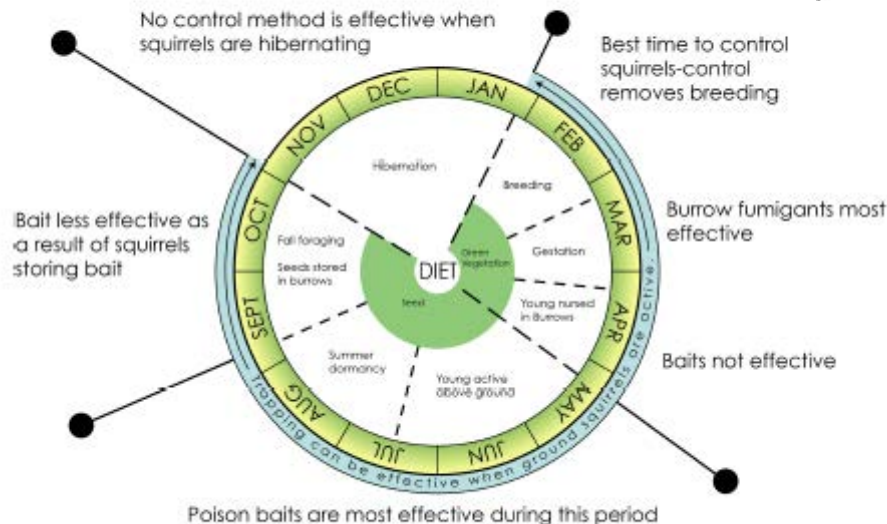


Figure 4. Control calendar wheel, English.

ARDILLAS DE TIERRA DE CALIFORNIA – CALENDARIO DE MANEJO



Figure 5. Control calendar wheel, Spanish.

What we've learned

- Engaging point of sale contacts for Maintenance Gardeners
- Timing of training depends on accounts – commercial vs residential
- Increased business skills?
- How can we maintain and update materials?

What about a Year-round IPM Program for Maintenance Gardeners?

[Citrus](#) > [Year-Round IPM Program](#) > [Bloom](#) > Diseases and Disorders of Fruit

Citrus

Diseases and Disorders of Fruit

Common diseases

- Alternaria rot
- Bacterial blast
- Blue and green mold
- Brown rot
- Septoria spot
- Sooty mold

Exotic diseases

- Citrus canker (Bacterial canker)
- Citrus greening

Occasional diseases

- Anthracnose
- Botrytis rot or gray mold (mostly on coastal lemons)

Uncommon or rare diseases (except in some old trees)

- Stubborn disease
- Tristeza

Disorders (abiotic and genetic)

- Chimera
- Frost
- Hail damage
- Peteca of lemon
- Phytotoxicity
- Puff and crease
- Rind disorder
- Split fruit
- Sunburn
- Wind scarring

[Soft decay of rinds or flesh](#)

[Discolored scabs, scars, or rough wounds on rinds](#)

[Fungal mycelia or spore growth](#)

[Cracked rinds or flesh, dry flesh](#)

[Firm, discolored rinds](#)

[Distorted or misshapen fruit](#)

Example of Year-round IPM Program component for Citrus
<http://www.ipm.ucdavis.edu/PMG/selectnewpest.citrus.html>

Year-round IPM Program?

Discolored scabs, scars, or rough wounds on rinds—[Top of page](#)



Hail damage

Identification tip: Hail impact causes discolored scars on fruit and twigs and tears or shreds leaves. Damage occurs on the exposed side of fruit, including locations not likely to have been impacted by equipment.



Wind scarring

Identification tip: Shallow, discolored scars on the rind occur when fruit rub against twigs or thorns, especially on lemon trees at exposed locations.



Peteca of lemon

Identification tip: This lemon malady causes depressions in the rind, which become discolored or brownish.



[Botrytis rot](#)

Identification tip: Brown raised elongate scars on this immature lemon were caused by Botrytis infection. Infected fruit may also develop raised gray bumps or irregular scars. If fruit are young when infected and conditions remain wet, fruit may turn brown and die.

Example of Year-round IPM Program component for Citrus

<http://www.ipm.ucdavis.edu/PMG/selectnewpest.citrus.html>

What we've learned

- Engaging point of sale contacts for Maintenance Gardeners
- Timing of training depends on accounts – commercial vs residential
- Accessing a mobile clientele group
 - Smartphone adoption by ethnicity
 - Compatibility with year-round IPM?
- What's the goal – urban pesticide use reduction or licensing?

Thank you

- Pest Management Alliance Funding
- UC IPM resources
- Farm Supply San Luis Obispo County
- Peer Trainers Dale Norrington and Suzanne McCaslin
- Bilingual Trainers Edwin Moscoso and Osvaldo Olmos

Questions?

- For copies of the IPM for Maintenance Gardeners curriculum contact:
 - Tamara Kleeman, Ag Inspector/Biologist
 - San Luis Obispo County Agricultural Commissioners
 - 805-781-5910
 - tkleeman@co.slo.ca.us